U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

02-OSR-0019

Mr. Ron F. Naventi, Project Manager
Bechtel National, Inc.
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC27-01RV14136 – OFFICE OF SAFETY REGULATION (OSR) APPROVAL OF BECHTEL NATIONAL, INC (BNI) AUTHORIZATION BASIS CHANGE NOTICE, 24590-WTP-ABCN-ESH-01-013, REVISION 1, CODES AND STANDARDS UPDATE/NPH DESIGN REQUIREMENTS

Reference: BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Authorization Basis Change Notice 24590-WTP-ABCN-ESH-01-013, Revision 1, Codes and standards Update/NPH Design requirements" CCN: 024505, dated December 10, 2001.

On the basis of the attached Safety Evaluation Report (SER), the U.S. Department of Energy, Office of River Protection, Office of Safety Regulation (OSR) approves the referenced Authorization Basis Change Notice, (ABCN), 24590-WTP-ABCN-ESH-01-013, Revision 1, to the Safety Requirements Document (SRD) for the River Protection Project-Waste Treatment Plant (RPP-WTP). The approval is in response to your ABCN submittal referenced above. The OSR approved all proposed changes contained in your submittal. The amendment application was noticed on the OSR website on December 17, 2001, and public comments were solicited. No public comments were received within the two-week comment period.

The proposed amendment revises several related sections of the SRD. The revisions include: (1) revision of SRD Safety Criteria 4.1-3 and 4.1-4 to change the Performance Category (PC)-3 categorization for Safety Design Class and Safety Design Significant controls that have a Natural Phenomenon Hazard function for chemical hazards to PC-2; (2) revision of the implementing standards citation in SC 4.1-2, 4.1-3, 4.1-4, and 4.1-5, and (3) incorporation of standards tailoring in Appendix C of the SRD to support the Partial Construction Authorization Request (PCAR). Also, as discussed in the attached SER, Section 3.0, please explicitly include PCA Publication, EB 080.01, "Strength Design of Anchorage to Concrete," to SRD Safety Criteria 4.1-2, 4.1-3, 4.1-4, and 4.1-5.

As part of the amendment implementation process, please submit within 14 days of receipt of this letter the revised pages of the SRD and the revision pages for each document identifying all revisions to date. This amendment is effective immediately and shall be fully implemented within 30 days, i.e., the provisions of the amendment may be used immediately; within 30 days, controlled copies of the SRD and subordinate documents must be modified to reflect the changes associated with this amendment.

If you have any questions please contact Dr. Walter Pasciak, OSR, (509) 373-9189. Nothing in this letter should be construed as changing the Contract, DE-AC27-01RV14136. If, in my capacity as the Safety Regulation Official, I provide any direction that your company believes exceeds my authority or constitutes a change to the Contract, you will immediately notify the Contracting Officer and request clarification prior to complying with the direction.

Sincerely,

Robert C. Barr
Safety Regulation Official
Office of Safety Regulation

OSR:KC

Attachment

Safety Evaluation Report (SER) of Proposed Authorization Basis Change Notice 24590-WTP-ABCN-ESH-01-013, Revision 1 to the Safety Requirements Document for the River Protection Project-Waste Treatment Plant by the Office of Safety Regulation

1.0 INTRODUCTION

The River Protection Project Waste Treatment Plant (RPP-WTP) authorization basis is the composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which the Office of Safety Regulation (OSR) Safety Regulation Official grants permission to perform regulated activities. The authorization basis includes that information requested by the Contractor for inclusion in the authorization basis and subsequently accepted by the OSR. The authorization basis for the RPP-WTP includes the Safety Requirements Document (SRD). The SRD contains the approved set of radiological, nuclear and process safety standards and requirements, which if implemented, provide adequate protection of workers, the public, and the environment against the hazards associated with the operation of the facility. By letter dated December 10, 2001, Bechtel National, Inc., (Contractor) submitted a proposed amendment to the SRD. This SER documents the OSR evaluation of the changes proposed by the Contractor.

The amendment proposes changes to several related sections of the SRD. The proposal includes: (1) revision of SRD Safety Criteria (SC) 4.1-3 and 4.1-4 to change the Performance Category (PC)-3 categorization for Safety Design Class and Safety Design Significant controls that have a Natural Phenomenon Hazard (NPH) function for chemical hazards to PC-2; (2) revision of the implementing standards referenced in SC 4.1-2, 4.1-3, 4.1-4, and 4.1-5 to reflect the most current design information from the industry for seismic and other natural phenomena hazards; and (3) incorporation of standards tailoring in Appendix C of the SRD to support the Partial Construction Authorization Request (PCAR).

2.0 BACKGROUND

The SRD contains the set of radiological, nuclear, and process safety standards necessary to ensure adequate protection of the health and safety of workers, co-located workers, and the public from radiological, nuclear, and process hazards. The standards contained in the SRD are developed by an iterative process. Included in the development process is a continuing review of industry practices, particularly those referenced in the SRD, and review of the results of the process hazards and accident analyses as they evolve with the design of the facility for potential impacts on the SRD standards used to define ensure protection of the public and workers. This amendment reflects modifications to the SRD resulting from changes made to industry standards that form the basis of the SRD.

Consistent with the SRD development process to continuously review pertinent industry practices, this amendment revises SRD Safety Criteria (SC) 4.1-3 and 4.1-4 by changing Performance Category (PC)-3 categorization for Safety Design Class and Safety Design

Significant controls that have a NPH function for chemical hazards to PC-2. This approach reflects an appropriate safety approach for workers, co-located workers and the public for accidents involving chemical releases, and reflects the typical chemical industrial safety approach.

The second change included in the amendment revises the implementing standards referenced in Safety Criteria 4.1-2, 4.1-3, 4.1-4, and 4.1-5 of Volume II in the SRD. This approach reflects the most current design information from the industry for seismic and other natural phenomenon hazards, such as wind, flood and snow.

The third change in the proposed amendment incorporates standard tailoring in Appendix C of the SRD to ensure that the Contractor's seismic and structural design for its facility reflects the most current industrial practices. This third change is also intended to be consistent with the design information presented in the Contractor's PCAR submittal.

3.0 EVALUATION

Changes to the SRD:

Proposed changes to SRD-SC 4.1-3 and 4.1-4: Change the PC-3 categorization for Safety Design Class and Safety Design Significant controls that have a NPH function for chemical hazards only to PC-2.

Evaluation (acceptable): The revision is acceptable because it aligns the designation of PC for RPP-WTP facility with the commercial industry with respect to chemical hazards. The chemical industry has adopted design standards embodied in the Uniform Building Code (UBC) when it deals with NPH events, including seismic, wind, flood, and snow. The corresponding UBC requirements can be implemented through the designation of PC-2 for non-seismic events. The change will allow the Low Activity Waste (LAW) facility to be designed and constructed commensurate with the potential hazards associated with the facility and not be designed too conservatively to meet codes and standards intended for facilities with much larger radioactive inventories.

Proposed change to the following implementing standards in SRD-SC 4.1-2, 4.1-3, 4.1-4, and 4.1-5: Change ACI 349-97 and ACI 349R-97 to ACI 349-01 and ACI 349R-01 respectively. Change ACI 530-95 to ACI 530-99. Change ASCE 4-98 (Draft) to ASCE 4-98. Change IEEE Std 344-1987 to IEEE Std 344-1987 (R1993).

Evaluation (acceptable): This revision is acceptable because these updated standards reflect the most current design information from the industry for seismic and other natural phenomena hazards. The new revision also reflects the current knowledge in material performance and technology and has been endorsed by respective committees responsible for establishing industry standards. ACI 349-01 reflects the most current methodology endorsed by the American Concrete Institute for concrete structures subjected to seismic loading. ACI 530-99 reflects the most current methodology endorsed by the American Concrete Institute for masonry design. ACI 530-99 has several different categories on how to perform seismic proportioning and detailing for masonry structures. Seismic Performance Category "D" in ACI 530-99 will be

adopted by the Contractor because it provides the most conservative methodology in performing seismic proportioning and detailing for masonry structures. ASCE 4-98 reflects the most current methodology endorsed by the American Society of Civil engineers for the seismic analysis of safety-related nuclear structures. IEEE Std 344-1987 (R1993) reflects the most current methodology endorsed by the Institute of Electrical & Electronic Engineers.

Proposed change to SRD-SC 4.1-3: Add ACI 530-99.

Evaluation (acceptable): The revision is acceptable because ACI 530 reflects the most current knowledge and methodology for performing seismic design of masonry structures. ACI 530 is already referenced as an implementing standard for masonry design in Safety Criteria 4.1-2 and 4.1-4. The proposed addition of ACI 530-99 covers masonry design for Seismic Category I/II facilities.

Proposed change to Appendix C of the SRD: Incorporate the tailoring for several standards in Appendix C and add one new standard in Safety Criterion 4.1-4 as follows:

(1) ANSI/AISC N690, "Specification for the Design, Fabrication and Erection of Steel-Related Structures for Nuclear Facilities," Section Q 1.5.7.1 (Primary Stresses) is to be modified (tailored) for the purpose of providing requirements for evaluating load combinations. The load combinations (D+L+Eo and D+L+Ro+To+Eo) on Page 22, Section Q 1.5.7.1 (Primary Stresses) of ANSI/AISC N690 are to be deleted as requirements for the RPP-WTP.

Evaluation (acceptable): These load combinations are required for the evaluation of an Operation Basis Earthquake (OBE). This revision is acceptable because identification of an OBE event is not required for the RPP-WTP.

(2) ACI 349-01, "Code of Requirements for Nuclear Safety-Related Concrete Structures," is to be modified (tailored) for the purpose of providing implementing standards for structural design of the RPP-WTP. Chapter 21 of ACI 349-01 is to be replaced with Chapter 21 of ACI 318-99 for seismic proportioning and detailing of RPP-WTP structural design.

Evaluation (acceptable): This revision is acceptable because it is consistent with the most current methodology for seismic proportioning and detailing of nuclear safety-related concrete structures. It also reflects the current knowledge in material performance and technology. It should be noted that the seismic proportioning and detailing methodology implemented in ACI 349-01 was adopted from ACI 318-95. Since ACI 318-99 is currently listed as one of the implementing standards in Safety Criterion 4.1-4 of the SRD, the tailoring of ACI 349-01 in the area of seismic proportioning and detailing methodology becomes necessary.

(3) ACI 318-99, "Building Code Requirements for Structural Concrete and Commentary," (Chapter 9, Section 9.2, Required Strength) is to be modified (tailored) for the purpose of evaluating load combinations for the design of reinforced concrete. Load combinations

will be evaluated for the design of reinforced concrete by use of equations (12-5) and (12-6) from Section 1612.2.1 of UBC 1997.

Evaluation (acceptable): The revision is acceptable because the adoption of the UBC approach for load combinations as expressed by equations (12-5) and (12-6) from UBC 1997 will be more conservative and comprehensive than those in ACI 318-99. The revision will also ensure adequate equivalency with commercial design in accordance with the UBC, which is the basis for the design of reinforced concrete for Seismic Category III SSCs for the RPP-WTP, as described in Safety Criterion 4.1-4 of the SRD.

(4) The "moderate seismic risk" category of ACI 318-99, "Building Code Requirements for Structural Concrete and Commentary," (Chapter 21, Section 21.2.1.3) will be used for the purpose of providing criteria for seismic detailing requirements for Seismic Category III design of reinforced concrete structures.

Evaluation (acceptable): The revision is acceptable because the "moderate seismic risk" classification is consistent with the definition of Seismic Category III for the design of reinforced concrete as described in Safety Criterion 4.1-4 of the SRD.

(5) ACI 318-99, "Building Code Requirements for Structural Concrete and Commentary," is to be modified (tailored) for the purpose of specifying requirements for the design of concrete anchorage. ACI 318-99 will follow the requirements of PCA Publication, EB 080.01 (Strength Design of Anchorage to Concrete).

Evaluation (acceptable): The revision is acceptable because the requirements of PCA Publication, EB 080.01 represent the most current industry approach for the design of concrete embedments. It also reflects the most current knowledge about the design of concrete anchorage. This design method had been adopted by the ACI 349 committee and used in ACI 349-01, Appendix B. Before this publication, Appendix B of ACI 349-97 was widely used as the industry standard for the design of concrete anchorage. Since the adoption of PCA Publication, EB 080.01 represents an addition to the SRD, PCA Publication, EB 080.01 should be explicitly listed in Safety Criterion 4.1-4 of the SRD as one of the implementing standards of the SRD.

(6) AISC M016, "Manual of Steel Construction, Allowable Stress Design", is to be modified (tailored) for the purpose of evaluating load combinations for the design of structural steel members for Seismic Category III SSCs for the RPP-WTP. Load combinations will be evaluated for the design of structural steel members by use of Section 1612.3 of the UBC 97.

Evaluation (acceptable): The implementation of AISC M016 is required for the design of structural steel for Seismic Category III SSCs for the RPP-WTP. This revision is acceptable because the load combinations for the design of structural steel members as identified in UBC 97 represent the most current commercial requirements for allowable stress design of structural steel. AISC and UBC designs are mostly compatible, but the load combinations as specified in the UBC are more comprehensive than those in AISC M016. In addition, UBC is the basic code recommended by DOE-STD-1020 for PC-2

NPH design (Seismic Category III and PC-2 for non-seismic NPH events for the RPP-WTP).

(7) AISC M016, "Manual of Steel Construction, Allowable Stress Design", is to be modified (tailored) for the purpose of providing detailed seismic requirements steel structures containing Seismic Category III SSCs for the RPP-WTP. The detailed seismic requirements will be those of UBC 97, Chapter 22, Division V, Section 2214, for "moderate seismic risk" category structures.

Evaluation (acceptable): The requirements contained in this section of UBC 97 (Chapter 22, Division V, Section 2214) represent the most current industry practice and knowledge for the design of important commercial steel structures. Use of this section will also ensure compliance of the design with UBC 97, which is the basis for the seismic design for SC-III structures, as described in Safety Criterion 4.1-4 of the SRD.

(8) UBC 97, "Uniform Building Code", design for snow loads is to be modified (tailored) for the purpose of evaluating snow loads. Design for snow loads shall be in accordance with ASCE 7, Minimum Design Loads for Buildings and Other Structures, Section 7.0, utilizing ground snow loads identified in Safety Criterion 4.1-4 of the SRD.

Evaluation (acceptable): The revision is acceptable because the adoption of snow load design in accordance with ASCE 7 represents the most current industry practice for the evaluation of structures under snow loads. ASCE 7 has more accurate methodology and is more conservative in its consideration of these loads than the UBC methodology.

(9) UBC 97, "Uniform Building Code", design for snow loads is to be modified (tailored) for the purpose of evaluating wind loads. Design for wind loads shall be in accordance with ASCE 7, Minimum Design Loads for Buildings and Other Structures, Section 6.0, utilizing 3-second gust values identified in Safety Criterion of the SRD.

Evaluation (acceptable): The revision is acceptable because the adoption of wind load design in accordance with ASCE 7 represents the most current industry practice for the evaluation of structures under wind loads. ASCE 7 has more accurate methodology and is more conservative in its consideration of these loads than the UBC methodology.

4.0 CONCLUSION

On the basis of the considerations described above, the OSR has concluded that there is reasonable assurance that the health and safety of the public and the workers will not be adversely affected by the proposed amendments, and that they comply with applicable laws, regulations, and RPP-WTP contractual requirements. Accordingly, the OSR approves the amendments to the SRD as proposed by 24590-WTP-ABCN-ESH-01-013, Revision 1.